

Technical Article Series

Circular Screen Separator Removes Lumps From Chemical Company's Product, Improving Quality and Bagging Efficiency

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Lumps in a fungicide required recycling that increased labor costs, so a chemical company installed a separator to deagglomerate most lumps and remove the rest.

Case History

Amvac Chemical Corp., Los Angeles, produces a chlorinated, organic fungicide in powder form for agricultural uses. To manufacture the proprietary fungicide, the chemical company receives tanker railcars of liquid raw materials. The materials are pumped to storage tanks and subsequently pumped to processing. After manufacturing a batch of the liquid fungicide, the batch is vacuum crystallized and then vacuum dried. Amvac releases a fungicide batch from the dryer three or four times per day, and a screw conveyor removes the dried product, which is finally packaged by a bag packer.

Fungicide Agglomerates Due To Static Electricity

The fungicide is prone to agglomerate due to electrostatic charge, resulting in lumps from about 1/8 to 1/2 inch in diameter that make up as much as 5 percent of the fungicide. The lumps reduce product quality and hamper the bag packing operation. In addition, the lumps must be recycled by first grinding them in a hammermill and then reprocessing the lumps, increasing overall labor costs.

Chemical Company Seeks Separator

The chemical company considered several vibrating screen separators to delump the fungicide and finally focused on a separator manufactured by a familiar equipment supplier. The manufacturer's separator appeared suited to delumping the fungicide. "It looked like the separator would do the best job," said Amvac's unit manager Doug Ashmore. "The manufacturer also gave us the best guarantee."

Because of the electrostatic charge effects on the fungicide, the separator manufacturer's engineers and a local engineering company representative offered suggestions to minimize the charge effects on separation efficiency. The separator was tested both in the manufacturer's test center and on-site at Amvac.

Separator Uses Brushes To Deagglomerate Lumps

The selected unit, a Vibroscreen 30-inch diameter circular screen separator, deagglomerates the fungicide on a 20-mesh screen, while separating remaining lumps for recycling. Material to be screened is fed to the screen's center. Vibration moves oversize particles to the screen periphery, where they discharge, while on-size particles pass through the screen. A circular base with rugged springs supports the separator and allows screen vibration without transmitting vibration to the floor.

A motor with a double extension shaft, fitted at each end with variable eccentric weights, is rigidly mounted to the separator's main assembly. A top eccentric weight imparts horizontal motion to the screen assembly, while a bottom eccentric weight rotates below the center of the assembly's mass, imparting vertical motion. The combined horizontal and vertical components produce an additional tangential motion to aid screening.

To maximize fungicide throughput on the screen, the separator is equipped with a set of brushes on radial arms extending from the screen's top center. The separator's inertial vibration actuates the brushes, which rotate as the machine vibrates to de agglomerate most lumps. The lumps separate from on-size powder particles at approximately 4,000 lb/h. A conductive gasket was installed to ground the equipment to the structure beneath the separator, thereby minimizing electrostatic charge buildup.

Unlike most plants that mount circular screen separators on the floor, the chemical company mounted the separator approximately 40 feet above ground level to permit gravity feed into a hopper. The separator is securely mounted over a large hopper that feeds on-size particles into the bagging operation. Separated oversize lumps exit the separator and fall through a pipe down the hopper's side into a poly-lined fiber

drum for future recycling.

Separator Meets Chemical Company's Present, Future Needs

The separator has operated successfully since installation in March 1991. "We've had no problems with it at all," Ashmore said. The separator reduces material recycling and increases the bag filling operation's efficiency. Because it can handle up to about 8,500 lb/h, the separator can satisfy the chemical company's capacity increase demands for some time to come.

Amvac installed the separator based on a trial purchase arrangement and eventually purchased the unit. The manufacturer's ability to modify the separator for the chemical company's specific processing line and application, as well as the trial purchase arrangement, met the chemical company's needs.